Developing Team Skills and Attitudes through Interprofessional Leadership Competencies

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Abstract

The health care industry increasingly recognizes interprofessional collaboration (IPC) as the key to optimizing delivery of care, and interprofessional education (IPE) has been the foundational method for building IPC. When IPC is examined, leadership skills of the practitioners are often seen as a positive force for optimizing team performance. This project aimed to deliver an education session sharing interprofessional leadership (IPL) competencies and the effect they may have on attitudes toward IPC. A pilot was designed for a single site, a student run clinic in a large city in the Southwest United States, which serves as a learning laboratory to help future health practitioners grow IPC skills through effective and innovative IPE. A search of the available evidence supporting this project revealed that educational activities delivered to practitioners can build the leadership skills seen in effective IPC. During the Fall 2017 semester, the education sessions were delivered to student practitioners at the clinic during their semester-long rotation. The University of the West of England Interprofessional Questionnaire, designed to measure self-assessment of attitudes toward collaborative learning and collaborative working, was deployed at the beginning and end of a semester-long rotation to all students working at the clinic to look for changes. A low sample size limited results to assessment of clinical significance, but showed some changes that could be significant if the project continues. Clinically significant changes show an increase in students' rating of their own skills and preferences toward interprofessional practice. In keeping with the learning laboratory model at the clinic, these outcomes support continued delivery and examination of the education model with subsequent clinic rotations to strengthen the conclusions being drawn from the results.

Interprofessional Leadership: Minding the Gap between Education and Practice

Since the introduction of the interprofessional education (IPE) core competencies (Interprofessional Education Collaborative Expert Panel [IECEP], 2011) and subsequent update incorporating interprofessional collaboration (IPC; Interprofessional Education Collaborative [IEC], 2016), the interprofessional community has worked to bridge the gap between IPE and IPC to ensure accessible and efficient population-focused care. This gap is a primary focus of an interprofessional practice, education, and research center within a large public research university in the Southwestern United States (the Center). It is also one of two major goals in a grant from the National Center for Interprofessional Practice and Education (National Center) titled *Interprofessional by Design™: Meeting at the Crossroads to Accelerate Leadership Competency and Readiness for Transition to Interprofessional Practice* awarded to the Center. This part of the grant aims to provide innovative leadership training integrated with the core competencies (IEC, 2016) to health profession students at a student run clinic in a large city in the Southwest United States (the clinic). Students who complete experiences in this clinic are introduced to skills that have been demonstrated to help interprofessional teams meet the Triple Aim of improving population health, value, and the experience of health care (Institute for Healthcare Improvement [IHI], 2016). There is a growing body of evidence supporting the impact IPE has on clinical practice (Reeves, Perrier, Goldman, Freeth & Zwarenstein, 2013) with recent studies exploring strategies for teaching and applying these skills in the clinical setting (Gordon, Rees, Ker, and Cleland, 2016; Margolis, Rosenberg, Umble, & Chewning, 2013). Examined summarily, the evidence indicates that inclusion of leadership skills training within IPE will help close the gap between the classroom and clinical practice.

Background and Significance

Epidemiology

The health care industry has long sought to educate future practitioners to provide efficient and safe patient care. Despite this focus, practitioners from all disciplines experience lack of coordination, collaboration and communication leading to medication errors (Institute of Medicine [IOM], 2000; IOM, 2007), inefficiencies in patient care (IOM, 2001; Williams et al., 2007), and poor clinical outcomes (Freeth, Ayida, Berridge, Sadler, & Strachan, 2006; Kvarnström, 2008; Reeves, 2016; World Health Organization [WHO], 2010). One solution has been the adoption of IPE that is defined as students from two or more disciplines learning from, about, and with each other (WHO, 2010). In 2012, a public-private partnership between the Health Resources and Services Administration, the United States Department of Health and Human Services, The University of Minnesota, and several private foundations led to creation of the National Center to advance both IPE and IPC (National Center for Interprofessional Practice and Education, 2017). The National Center has become the place where education and practice leaders have come together to share ideas, promote research, and develop innovative practices to meet the Triple Aim goals of improving the patient experience, health of populations, and per capita cost of health care (IHI, 2016). Continued work is needed to establish a firm link between IPE and improved patient outcomes (IOM, 2015; Reeves et al., 2013), but one proposed solution is teaching leadership competencies to help future practitioners guide interprofessional teams more effectively (Margolis et al., 2013).

Shifting Focus

Current research has focused on the characteristics of IPE delivery to determine the effectiveness of the timing, setting, and educational outcomes (IOM, 2015). A search of evidence shows little work has been done to teach clinicians leadership skills consistent with

interprofessional competencies to better prepare them for transition to interprofessional practice (IPP). Traditionally, leadership is considered a business skill, and health care professionals are beginning to focus on leadership competencies as an essential component of successful clinical practice (Heckman et al., 2014; Kanste, Halme, & Perälä, 2016; Lawrence, & Whyte, 2012; Levy, Gentry, & Klesges, 2015). More recent work shows that leadership theory is increasingly invoked to guide health care delivery models (Brewer, Flavell, Trede, & Smith, 2016). This shift should compel health care educators to continue closing the gap through teaching application of leadership skills to the interprofessional practitioner. Incorporation of this growing focus on leadership in the clinical setting provides a strong foundation to inform the work at the clinic as part of the ongoing focus on IPE and IPC.

Interprofessional Education

IPE is not a new concept; it has been an increasing focus of innovative health education for many decades (Reeves, 2016). A renewed call to action in 2000 championed IPE as a viable solution to the fragmentation of global health care delivery. The end goal is to "better utilize interprofessional education and collaborative practice strategies to strengthen health system performance and improve health outcomes" (WHO, 2010, p. 14) as displayed in Figure 1. To meet this challenge, the evidence provides guidance on how best to design and implement IPE. IPE addresses the complex nature of health care delivery, fostering collaboration as a cornerstone to promoting coordinated care (Reeves, 2016; IOM, 2013). Many efforts in IPE have incorporated the nationally-adopted Interprofessional Education Collaborative (IPEC) core competency domains of values and ethics, roles and responsibilities, communication, teams and teamwork (IECEP, 2011) and collaboration (IEC, 2016). These competencies serve as an important guide for developing meaningful IPE; but the evidence also supports teaching health

profession students to drive collaborative care by incorporating team leadership competencies.

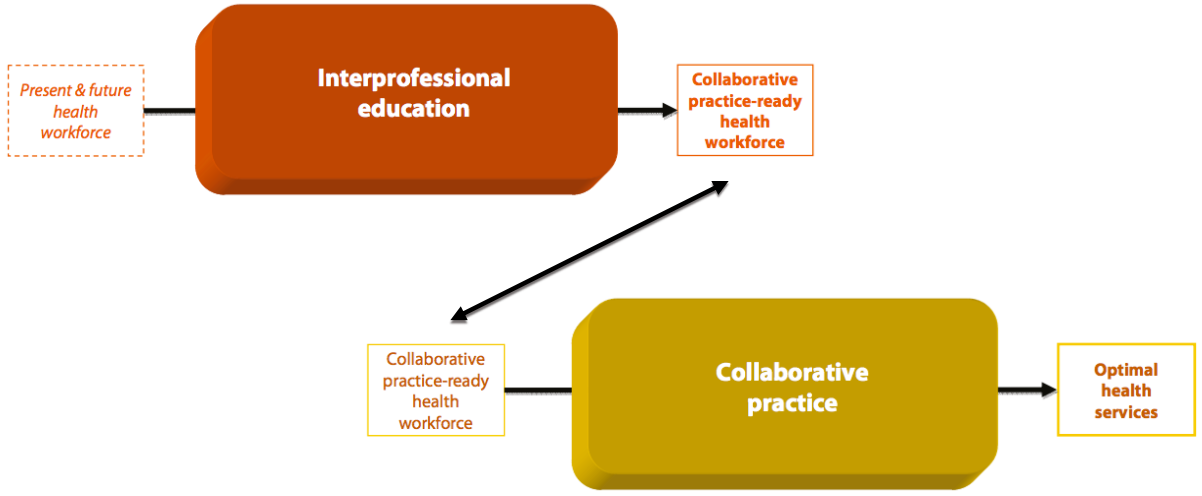

Figure 1. The relationship between interprofessional education and collaboration (WHO, 2010)

Leadership Competencies

Leadership skills are readily identifiable, and many industries have embraced them to help guide educators and practitioners alike. The literature shows consistent leadership behaviors across cultures (Posner, 2013) and similar competencies among diverse professions including nursing, social work, public health, and business with common themes of open communication, ethical behavior, client/community relations and advocacy, influence, and flexibility (American Organization of Nurse Executives [AONE], 2015; Giles, 2016; Wimpfheimer, 2004; Wright et al., 2000). These competencies are mirrored in studies identifying characteristics of interprofessional teamwork (Nancarrow et al., 2013), supporting the importance of leadership competencies within the overarching topic of IPC. In fact, there is increasing agreement that leadership education can build interprofessional skill in the clinical setting (Senn, 2014; Willems et al., 2013; Wright et al., 2000) which highlights a need to define and deliver the knowledge, skills, and attitudes necessary for leadership competence through IPE experiences.

Internal Evidence

The clinic is used to train health profession students through a student-run, IPP model. Current IPE at the clinic focuses on the clinical skills of an interprofessional team rather than team leadership competencies of the individual practitioner. As such, students are not intentionally prepared to embody known leadership skills that align with interprofessional competencies, both which espouse themes of effective communication, respect for other disciplines, building team consensus, and honoring the values of others (AONE, 2015; Giles, 2016; IECEP, 2011, MCH Leadership Competencies Workgroup, 2009; Wimpfheimer, 2004). These leadership skills are needed so future practitioners can guide interprofessional teams to effectively collaborate (Pittenger, Fierke, Kostka, & Jardine, 2016; Reeves et al., 2013). This aims to improve clinical outcomes, thereby meeting the Triple Aim goals of improving the patient experience, health of populations, and per capita cost of health care (IHI, 2016). This project will support the development of leadership training for students at the clinic to meet this gap in IPL education.

Problem Statement

Efforts to fully understand the influence of leadership-focused IPE on IPC led to development of the PICOT question, “how does teaching health discipline students at a student run clinic (P) interprofessional leadership competencies (I) compared to the existing interprofessional education model (C) affect leadership competencies (O)?” This clinical question guided a systematic search of evidence to support leadership content within IPE. See Appendix A for a flow diagram of how the literature search was conducted.

Search Strategy

An exhaustive literature search was completed via PubMed, CINAHL, ProQuest, Web of Science, Cochrane, and ABI/Inform databases. The target databases were chosen to examine approaches to leadership education and IPP / IPC across the disciplines of nursing, medicine, and business. The search used MeSH terms and keywords to capture all iterations of the main concepts examined: education, interprofessional, competency, collaboration, health care, and leadership. Terms were expanded to include all known uses of these key terms to accommodate for discipline-specific language. The search strategy was designed to capture evidence supporting both leadership training regardless of industry, and interprofessional competency in the health care arena regardless of discipline. Limits were placed on all searches to capture only articles written in English. Because the link between efforts to build leadership competencies and IPE is new, searches were also limited to studies published between January 1, 2012 to January 1, 2017 to further limit the yield.

Search Yields

The yields for each database search are displayed in Appendix A. The initial screening of articles was done by a scan of the abstracts. The remaining articles were read in detail, including an ancestry search of relevant reference articles. A total of 366 articles were reviewed during this process, leading to the exclusion of 344 articles that were duplicates, or unrelated to the topic. A rapid critical appraisal was conducted on the remaining 22 articles, which led to the final selection of 10 studies to form the evidentiary base for this project.

Critical Appraisal and Synthesis of Evidence

Creating evidence-based innovation within the complex health care system relies on changes often occurring along the outer edges of the available evidence (Lalley & Clouthier, 2017). Synthesizing research on effective IPE and leadership competencies involves chunking

heterogeneous constructs to create new practice that exists between the foundations of evidence and the upper reaches of innovation. Recommendations for practice change should rely equally on real-world phenomena and research outcomes. This is certainly the case for this project, which aims to merge the disparate concepts of leadership and IPE into one cohesive and innovative context.

Analysis of data uncovered in the literature search for this project laid the foundation for the project design. The supporting evidence was analyzed for level of evidence (Melnyk & Fineout-Overholt, 2011), quality, rigor, project design, and outcomes, as displayed in the synthesis table (Appendix B). The heterogeneity of studies limits the degree of generalizability, impacting both validity and reliability of the results. Despite the difficulties in analyzing scientific consonance among the evidence, there are conclusions to be drawn that support the direction of leadership-focused IPE. Many studies (88.9%) focused on a practitioner population, providing a good fit with the intent to develop leadership training for student practitioners at the clinic. In addition, most studies (89.3%) incorporated an interprofessional mix of learners in the interventions. Another important similarity among studies is that IPE was articulated most commonly as didactic instruction (82.1%) rather than experiential (25.0%), although some programs used a combination of both (10.7%). This indicates that IPE is most easily delivered using classroom-based learning in the form of focus groups, workshops, or case-based exercises.

The evidence also provides direction on the outcomes of IPE that could guide the aims for an intervention at the clinic. Measurement focused more on patient or clinical outcomes (60.7%) with a less common emphasis on team or practitioner competencies (39.3%). Specific phenomena of interest within the studies include leadership (21.4%), communication (14.3%), IPP / IPC (57.1%), teamwork (25.0%), and emotional intelligence (3.6%). Although IPP and IPC

are broad concepts, these outcomes focused on the overarching theme of effective collaboration by an interprofessional team.

A final analysis of the evidence includes an assessment of the feasibility of replication of the study, as well as overall goodness of fit for the clinic environment. Most of the studies would be replicable in future interventions (89.3%). However, this did not necessarily correlate with a determination of goodness of fit for the clinic (32.1%). This was based on author judgments regarding environmental characteristics, student practitioner availability, and scheduling limitations, all of which must be met to best fit the existing IPE model of the clinic.

Conclusion and Discussion of Findings

Despite the heterogeneity of the studies, synthesis of the data provided guidance on how best to structure leadership-based IPE at the clinic. The body of evidence shows that IPE is most often directed at practitioners using a didactic modality of teaching (Gaskell & Beaton, 2015; Margolis et al., 2013; Nancarrow et al., 2013; Reeves et al., 2013; Shanta & Gargiulo, 2014; Sunderji, Waddell, Gupta, Soklaridis, & Steinberg, 2016; Willems et al., 2013; Zwarenstein, Goldman, & Reeves, 2009), which would be a good fit for future IPE design for the students at the clinic. In addition, the study outcomes were predominately focused on the individual competency of the practitioner rather than patient outcomes (Gaskell & Beaton, 2015; Gordon et al., 2016, Margolis et al., 2013; Nancarrow et al., 2013; Nicksa, Anderson, Fidler, & Stewart, 2015; Reeves et al., 2013; Shanta & Gargiulo, 2014; Sunderji et al., 2016; Willems et al., 2013). This highlights a need to design future programs that can verify a more explicit link between IPE and clinical outcome data, which is a well-known gap in IPE research (Reeves et al., 2013). When examined summarily, the included evidence and synthesis supports the project, which was designed to develop and deliver leadership-focused IPE education at the clinic.

The most frequent outcome of interest that supported this project is practitioner attitudes toward collaborative working and learning (Gaskell & Beaton, 2015; Gordon et al., 2016, Margolis et al., 2013; Nancarrow et al., 2013; Nicksa et al., 2015; Reeves et al., 2013; Shanta & Gargiulo, 2014; Sunderji et al., 2016; Willems et al., 2013). The synthesis of evidence across health and business disciplines supports providing education to interprofessional practitioners to develop the leadership skills needed to positively impact IPC. By delivering an educational program grounded in the literature and resulting evidence synthesis, and measuring changes in attitudes using a self-assessment tool with significant validity and reliability data, the results of the project will help guide the dissemination of this innovative educational model to other clinical sites and IPE offerings at stakeholder organizations. The outcome of this project highlighted the impact of a new IPE module that explored leadership skills within the context of IPP and IPC. The implication of this work was the creation of innovative practice that resides upon the foundations of evidence.

Purpose Statement

Education at the clinic currently does not include any learning material explaining either interprofessional or leadership competencies. This is an intentional gap so that students would enter the clinic without any outside influences on their innate practice style. This has led to students naturally sharing team leadership based on the experiences they have with patients at the clinic. While this strategy has allowed IPL to evolve, there is no unifying structure to ensure that students understand how their behaviors meet these competencies. This project took place at the student-run clinic which was founded upon an interprofessional philosophy. The student-run model has been shown to be an effective vehicle for improving care delivery and outcomes (Liberman et al., 2011; Meah, Smith, & Thomas, 2009), and enhancing the experience to

incorporate IPL competencies will add to the learning that already occurs.

Guiding Theory

Evidence Based Practice Model Guiding Project Design

The Iowa Model (Sanares-Carrean & Heliker, 2017; Titler, 2010) is effective for change projects in large, complex systems, featuring key decision points that move from problem identification through monitoring outcomes and dissemination of results (see Appendix C). The articulation of this project closely followed the key milestones within the Iowa Model.

Implementation of the innovative IPE design began with the identification of both knowledge- and problem-focused triggers with the clinic. Due to the changing focus within the IPE realm to include leadership competencies, this project was a priority for the clinic leadership and the clinic stakeholders, leading to broad support for this project. The Iowa model includes identification of the stakeholder team (Sanares-Carrean & Heliker, 2017), relying on a multidisciplinary team approach to improving health outcomes (Titler, 2010). The model guides change at both the system and individual level (Bondmass, 2014). For this project, the stakeholders included education, community, organizational, and national partners (Figure 2), all of whom were increasingly aware of the gap between IPP and IPL. The next steps in the model were accomplished with the systematic search of evidence, and synthesis and critique of the relevant data. The model also guided definition of the project outcomes, collection of existing benchmark data, creation of the EBP guidelines for the IPE design, implementation of a pilot of the new IPL learning module, and evaluation of both the process and outcomes. Outcomes will provide the basis to modify existing IPE guidelines, guiding full implementation of the new practice at all sister clinics and partner sites.

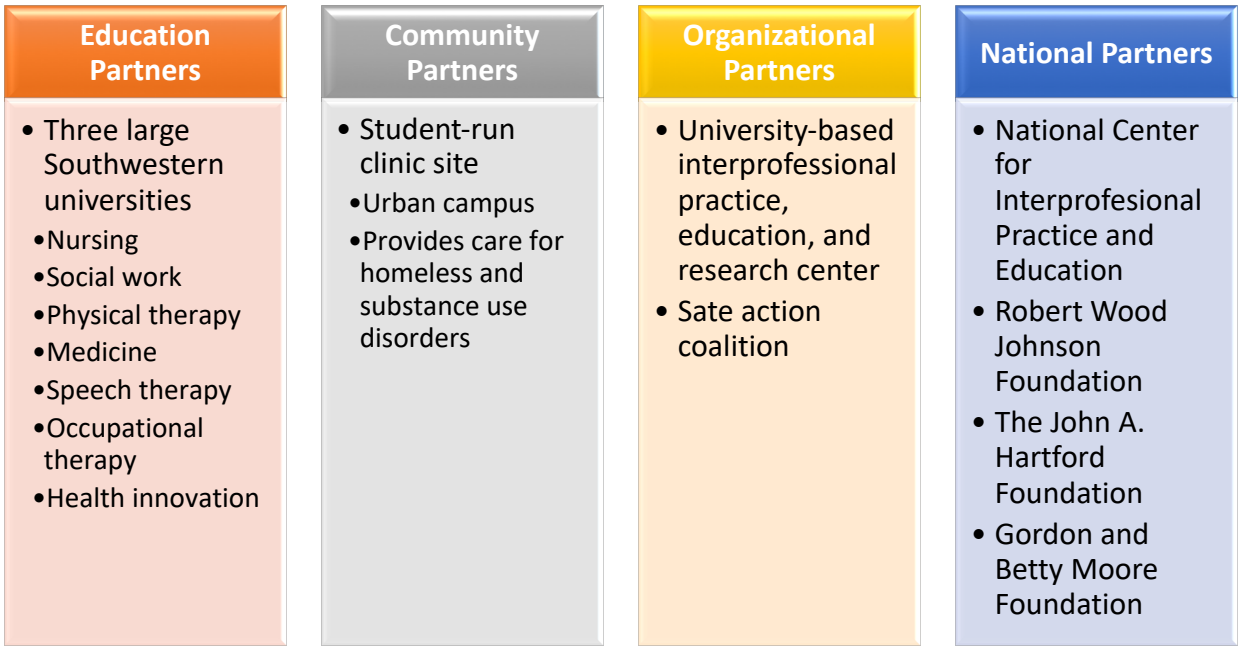

Figure 2. Project stakeholders

Theoretical Model Guiding Intervention

Avedis Donabedian, a pioneer of quality issues within healthcare (Anderson, 2015), has been influential to the improvement of health services through a focus on quality of care delivery. His work led to development of the Structure-Process-Outcome (SPO) Model (Ayanian, & Markel, 2016) which was chosen as the theoretical framework for this project. The SPO has served as the foundation for the Institute of Medicine reports, including the six aims for improving quality as outlined in *Crossing the Quality Chasm* (Ayanian, & Markel, 2016). These aims, including safety, effectiveness, and efficiency (IOM, 2001), are all directly related to how well interprofessional teams work together through cooperation, transparency, and knowledge-sharing (IOM, 2001). This focus on improving delivery of patient-centered care made this the ideal theory for guiding the implementation of new, IPL-focused IPE at the clinic.

According to Donabedian, quality improvement efforts should aim to find the most efficient and valid processes that lead to optimal patient care. These processes are the goal of all IPE experiences at the clinic, as they bring benefit to the patient and improve cost of care delivery (Anderson, 2015, Donabedian, 2003). The SPO Model is a stepwise framework that defines the characteristics of the setting (structure), an understanding of what will be done (process), and how it will affect the patients (outcome). By identifying each of these characteristics within the clinic, the theory helped articulate how an educational module could be used to influence student attitudes toward collaborative practice that can improve patient outcomes as students translate this knowledge into their future professional roles. This project established an evidence-based lesson plan (process) for teaching IPL skills at the clinic (structure) that can improve IPP / IPC (outcome).

Project Methods

The project implemented a new education session aimed at introducing students to both interprofessional and leadership competencies based on available evidence. Student practitioner groups rotate through the clinic every Saturday of each 16-week semester, with each of four groups assigned four specific rotation dates. The education was delivered on the second of the four rotation days at the clinic, from September 23 through October 14, 2017. The education sessions were delivered during morning huddles, offering minimal interruption to the typical schedule of the clinic operations. The benefits extend beyond the students to include practitioners, student clinic leadership, and faculty preceptors, most of whom have never been introduced to this content. By understanding the skills needed for effective IPL, faculty and students will have the knowledge needed to adjust their practice, which can lead to improved IPC and patient experiences.

Ethical Considerations

A non-random sampling process was used to recruit students to participate in this project. The project was approved through the academic Institutional Review Board (IRB), receiving exempted status as an educational project (STUDY00006834). All students participating in a clinic rotation during the Fall 2017 semester were sent an email by the clinic student leadership team, which included a recruitment script and consent. Immediately prior to delivery of the education, consents were obtained from those students willing to share their data with this study. The education was delivered to all those present at the huddle, including student leaders and preceptors, regardless if they provided consent.

Innovation Leadership

This project was facilitated through collaboration with many stakeholders. The student leaders of the clinic supported the time needed to implement the project, providing the access and communication structures needed to recruit student participants. The educational and organizational partners also fully supported this project through sharing of data, access to resources, and scholarly guidance and support to ensure the project met the needs of all interested parties. The project is an articulation of innovation leadership concepts that provide the framework for implementing change within a complex system. Specifically, this project harnesses reflexivity; this concept speaks to the dynamic interplay between a clinician, the surrounding environment, and the background evidence (Lalley & Clouthier, 2017). This project was designed to help student practitioners build their own knowledge based on reflection of their practice experiences and the literature supporting this project. This may lead to shifts in practice that incorporate interprofessional leadership with the aim of influencing IPC.

Implementation

The educational intervention was delivered during the morning huddles at the clinic, which is located in a county-run homeless health clinic complex in an urban southwest location. The clinic site was chosen not only for the student-led, learning laboratory model, but also for the organizational philosophy supporting innovations in IPE. The education included a discussion of both IPE and leadership competencies that came from the evidence in the literature and the results of previous research based on student interviews conducted at the clinic. In addition, students were asked to identify interprofessional leadership skills, and reflect on how leadership competencies could impact their practice.

Data Collection

To assess whether this education model impacted self-assessment of interprofessional collaboration, a paired pre- and post-test design using the University of the West of England Interprofessional Questionnaire (UWE-IQ) survey tools (Appendix D) was used. The pre- and post- surveys were administered to all students who participate in the semester-long clinic rotation. The surveys are managed using REDCap electronic data capture tools. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies (Harris et al, 2009).

The UWE-IQ survey tool began with construction of three scales aimed at measuring attitudes of students toward collaborative learning (Pollard et al., 2004). The three scales were developed using exploratory factor analysis, revealing a statement load > 0.35 to only one factor with strong correlation with one another (Pollard et al., 2004; Pollard, Miers & Gilchrist, 2005). The Communication and Teamwork Scale has 9 items that allows students to assess their own communication and teamwork skills using a 4-point Likert scale; the Interprofessional Learning Scale has 9 items exploring student attitudes toward interprofessional learning using a 5-point

Likert scale; the Interprofessional Interaction Scale has 9 items for students to rate their perceptions of interactions between various health professionals using a 5-point Likert scale. A fourth Interprofessional Relationships Scale features 8 items assessing students' perceptions of their relationships with interprofessional colleagues using a 5-point Likert scale (Pollard et al., 2005). Pearson's correlations coefficients for scores on all scaled confirmed strong correlations, and internal consistency was established with Cronbach's alpha coefficients for all four scales: Communication and Teamwork Scale ($r = 0.78$, $P < 0.001$, $\alpha = .76$), Interprofessional Learning Scale ($r = 0.86$, $P < 0.001$, $\alpha = .84$), Interprofessional Interaction Scale ($r = 0.77$, $P < 0.001$, $\alpha = .82$), and Interprofessional Relationships Scale ($r = 0.95$, $p < 0.001$, $\alpha = .71$).

Outcome Measures

Students already take the UWE-IW surveys at the beginning and end of the clinic semester rotation as part of the learning laboratory model. The survey uses Likert Scale questions, asking students to self-assess their attitudes toward interprofessional collaboration. The items in the UWE-IQ survey contain ratings of the respondent's values, judgements of observed behaviors, preferences for specific practices, and skill statements where respondents rate their own ability to exhibit interprofessional behavior. Examples of each type of item include:

- Learning with students from other health and social care professions is likely to improve the service for patient/client (Value);
- All members of health and social care professions have equal respect for each discipline (Judgement);
- I would enjoy the opportunity to learn with students from other health and social care professions (Preference); and,

- I feel comfortable working in a group (Skill).

Project Costs

The cost to implement this project were minimal, requiring printing of materials, purchase of materials (books) as resources for the project lead, and incentive gifts for participants as approve by IRB. The project lead was granted a $1000 Scholarship Award through the Sigma Theta Tau International Honor Society of Nursing. The project expenses were specifically budgeted to stay within the award amount (see Table 1)

Table 1

Expenses Related to the Project Design, Implementation and Evaluation

Item	Details	Cost
Books to guide the design, implementation and evaluation of the project	• Qualitative research methods ($17.22) • Statistics guides ($118.12) • DNP project resources ($191.55)	$326.89
Printing of materials used during implementation of education sessions	6 pages x 120 color copies ($0.42/page)	$302.40
Incentive gifts for participants as approved by IRB	• Food for four huddles • Gift cards for student leaders	$392.16
	Total Cost	$1,021.45

Outcomes and Results

The total number of students across four cohort groups assigned a clinic rotation was 87, with 40 (45.9%) consenting to participate in this project (see Table 2). Of the 40 students who consented, four (4) completed both the pre- and post-surveys that were used for analysis. Inferential statistics were not run due to the small sample size, and statistically significant changes in participant attitudes cannot be determined. However, the data was examined for potential clinical significance and there are some conclusions that can be drawn from the data.

Table 2

Composition of the project sample

Date	Cohort group	Total Students in Attendance	Students Consented to Project
09/23/2017	A	15	11
09/30/2017	B	19	7
10/07/2017	C	30	14
10/14/2017	D	23	8
	Total	87	40

Demographics

Of the four (4) students who completed the pre- and post- UWE-IQ surveys, all (100%) were female, Caucasian, and native English-speaking. The students all attended a single university, with only one (1) reporting their specific program of study: Speech and Language Pathology. The students were a mix of undergraduate (75%) and graduate (25%), and were evenly split between Hispanic/Latino (50%) and non-Hispanic/Latino (50%). The age of the students were unevenly distributed across US Census age categories, with 75% falling in the 20 to 24 year-old category, and 25% in the 40-44 year-old category. While the small sample size precludes any conclusions about the distribution of the sample, these demographics are in line with similar characteristics of the nursing profession. The latest National Nursing Workforce Study data shows the majority of working nurses to be female (85.9%) and Caucasian (80.5%; National Council of State Boards of Nursing & The Forum of State Nursing Workforce Centers, 2015). Analogous workforce data does not exist for other health profession students so similar comparison to this project sample could not be made.

Data Analysis and Clinical Significance

Data analysis was performed using IBM® SPSS® Statistics 23 software. The primary, short-term study question was looking for changes in attitudes toward collaborative learning and practice after implementation of the IPL competency learning module. Due to the low sample

size, analysis was completed by calculating the standard deviations and comparing means of the pre- and post- survey item responses (see Appendix E). If the difference in means was ≥ 0.5, the assumption by the project lead is that a larger sample size and inferential analysis of the paired samples may show a significant change. Nine (9) items showed large changes in means between pre- and post-evaluation. However, only three (3) items showed an increase in means (item 5 in the Communication and Teamwork Scale, item 12 in the Interprofessional Learning Scale, and item 34 in the Interprofessional Relationship scale). The remaining six (6) items showed a decrease in means: item 1 in the Communication and Teamwork Scale; items 23 and 24 in Interprofessional Interaction Scale; and items 30, 31 and 33 in the Interprofessional Relationship Scale. The same method was used to compare the means for each of the four scales, which showed no clinically significant shifts.

When looking at changes in means during the post-evaluation, it is important to consider the meaning of the shift. For the three items that showed a clinically significant increase in mean scores, the respondents were rating their own skills and preferences. Results showed that after the experience, respondents felt more comfortable putting forward personal opinions (item 6), have an increased preference for learning with peers from other professions (item 12), and have increased confidence when working with other disciplines (item 34). The decreased mean scores in the post test focused on both an assessment of skill, and judgement of observed behaviors. After the rotation, respondents indicated they: felt less comfortable justifying their recommendations face-to-face with more senior colleagues (item 1); have a reduced understanding of the roles of difference professionals (item 30); and, are less confident in their relationship with other disciplines (item 31). They also judged situations less positively, indicating reduced confidence that: members of health professions have equal respect for each

discipline (item 23); it is easy to communicate openly with other disciplines (item 24); and they feel respected by people from other disciplines (item 33).

The items with positive shifts highlight areas of growth that occurred during the clinic rotation. In addition, the areas showing decreased scores after the rotation can guide the clinic leadership and stakeholders when designing future learning activities for the rotation. There were more items showing large drops in mean scores, but all significant changes offer opportunities for deeper reflection. Negative changes in scores could be the result of students experiencing IPP, and the barriers commonly associated with IPC, for the first time during the rotation. Working with other disciplines and overcoming the challenges of power differentials between disciplines can be difficult for novice practitioners to navigate. Despite this, the items with mean increases indicate that the respondents viewed the experience as a positive one that has led to growth in the skills and abilities necessary for effective IPC.

Discussion

Project Impact

This project was the first iteration of a new IPE experience that can be refined and expanded over time. The intent of this pilot was to support the learning laboratory model through the design and deployment of innovative learning opportunities that can have a collective impact on longer-term outcomes aimed at improving IPP and IPC. This project examined changes in student attitudes about collaboration. Over time, continued examination of outcomes and refinement of the learning module can lead to lasting and positive changes to the student experience at the clinic. These changes in attitudes can be carried forward with graduates into the professional health care environment, helping to shift the health care culture to a more cooperative approach to care delivery that has been shown to improve patient care outcomes.

Looking at the clinical significance of these results highlights some initial conclusions that can help guide revisions to the learning module moving forward.

Project Sustainability

This project was designed through a strong collaboration between the project lead and the education partner stakeholders. There is growing interest in ways to develop IPL competence as part of the IPE experience at the clinic, and this project provided a starting point for this work. The intention is that this project will continue to expand, sharing IPL competencies in a meaningful way across a variety of student-run clinics and IPE venues. One strategy that has been proposed is the development of an online learning module that could be deployed to students as part of the clinic rotation without the need for dedicated faculty trained to deliver the content consistently from semester to semester. The cost to develop an online module would be a one-time expense paid using faculty workload that could have lasting impacts on student learning moving forward.

Strengths

The project was designed to evaluate the effectiveness of a learning module to share the newly created IPL competencies as part of the student rotation at the clinic. Because the clinic is considered a learning laboratory, the leadership and faculty preceptors are always looking for strategies to enhance student learning about IPP and IPC. Student practitioners, clinic leadership, and faculty preceptors were receptive to the IPL competencies, and how they might influence collaboration. While the number of participants was not sufficient to determine statistical significance, the opportunity for students to reflect on their own leadership practice as a member of the interprofessional team is an important first step to developing this competence.

Limitations

Limitations of this project included a small sample size, confounding factors within the clinic environment, and known potential for inflation of self-scoring on pre-survey scores, impacting the conclusions drawn about the data. The sample size of this initial project was insufficient run inferential statistics to establish the efficacy of the intervention. The response rate for students rotating through the clinic has been historically low for all evaluation tools in use. This could be due to many reasons, including the multiple demands placed on students, and survey fatigue due to the volume of surveys used both at the clinic and through the college experience.

Because the IPL competency education was delivered as part of a 4-session, semester-long clinical rotation, it is hard to isolate and one element of the experience for analysis of effectiveness. The project was designed to enhance the existing experience but is not something that can be disaggregated from the results given the chosen method of evaluation. It is the hope of the clinic leadership and project lead that this will continue to evolve in coming semesters, allowing for a more robust sample and statistical analysis of survey scores to continue to refine the learning module over time.

In addition to the limited sample, there is another confounding factor that must be considered when analyzing subjective data ranking interprofessional attitudes among students. According to Levinson, Gordon, and Skeff (1990), pre-/post-evaluation of self-perceptions more accurately reflects a change in understanding of the phenomena of interest rather than a shift in knowledge or attitudes of the subject completing the evaluation. Future efforts to study the impact of IPL competency education at the clinic would benefit from a retrospective pre-/post-evaluation to account for this effect (Sanborn, Cole, Kennedy, & Saewert, 2018).

Conclusion

While IPE is not a new concept, intentional inclusion of IPL competencies in learning experiences with health profession students is gaining attention as one possible way to close the gap between IPE and IPP. Current work in IPE has focused on the nationally-adopted IPEC competency domains of values and ethics, roles and responsibilities, communication, teams and teamwork. Yet, evidence shows that leadership of interprofessional teams is needed to drive collaborative care to meet the Triple Aim goals of improving the patient experience, health of populations, and per capita cost of health care. This effort must begin with a broad census of leadership competencies, which have been defined across many disciplines, and can help build interprofessional skill of health practitioners. The clinic stakeholders are interested in this growing emphasis on leadership skills, setting the stage for this project to explore new ways of incorporating IPL into the clinic rotation.

This pilot has set the stage for continued development of the learning module guided by continued measurement of the outcomes. Improving leadership abilities, according to the evidence, can promote the ability for health practitioners to improve the quality of patient care delivery. Preliminary conclusions show that the clinic experience, including the IPL competency education, does impact student self-assessments of the values, skills, and behaviors central to effective collaboration. While the results of the semester-long experience cannot be disaggregated to highlight any one learning experience over another, there is value in continuing this education module as a complement to the other learning experiences that make up the clinic rotation. This is a simple and cost-effective learning activity that could be modified for deployment in an online format for students to reflect upon the leadership skills that influence IPP and IPC. Evidence shows a growing association between leadership competence and IPP,

and this would be a sustainable complement to the current IPE experiences at the clinic to solidify this correlation.

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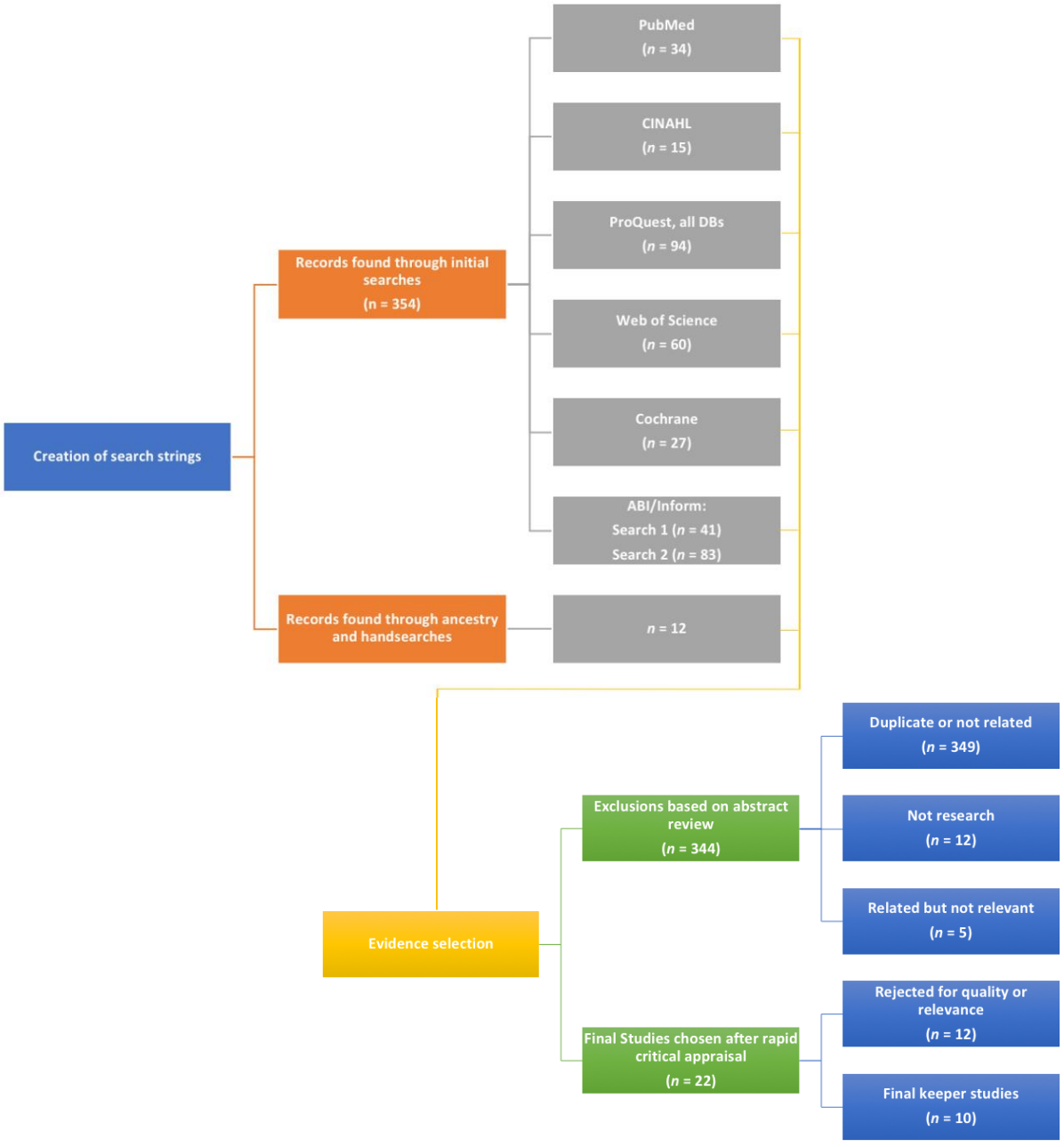
Appendix A

Literature Search Flow Diagram



Appendix B

Table C1

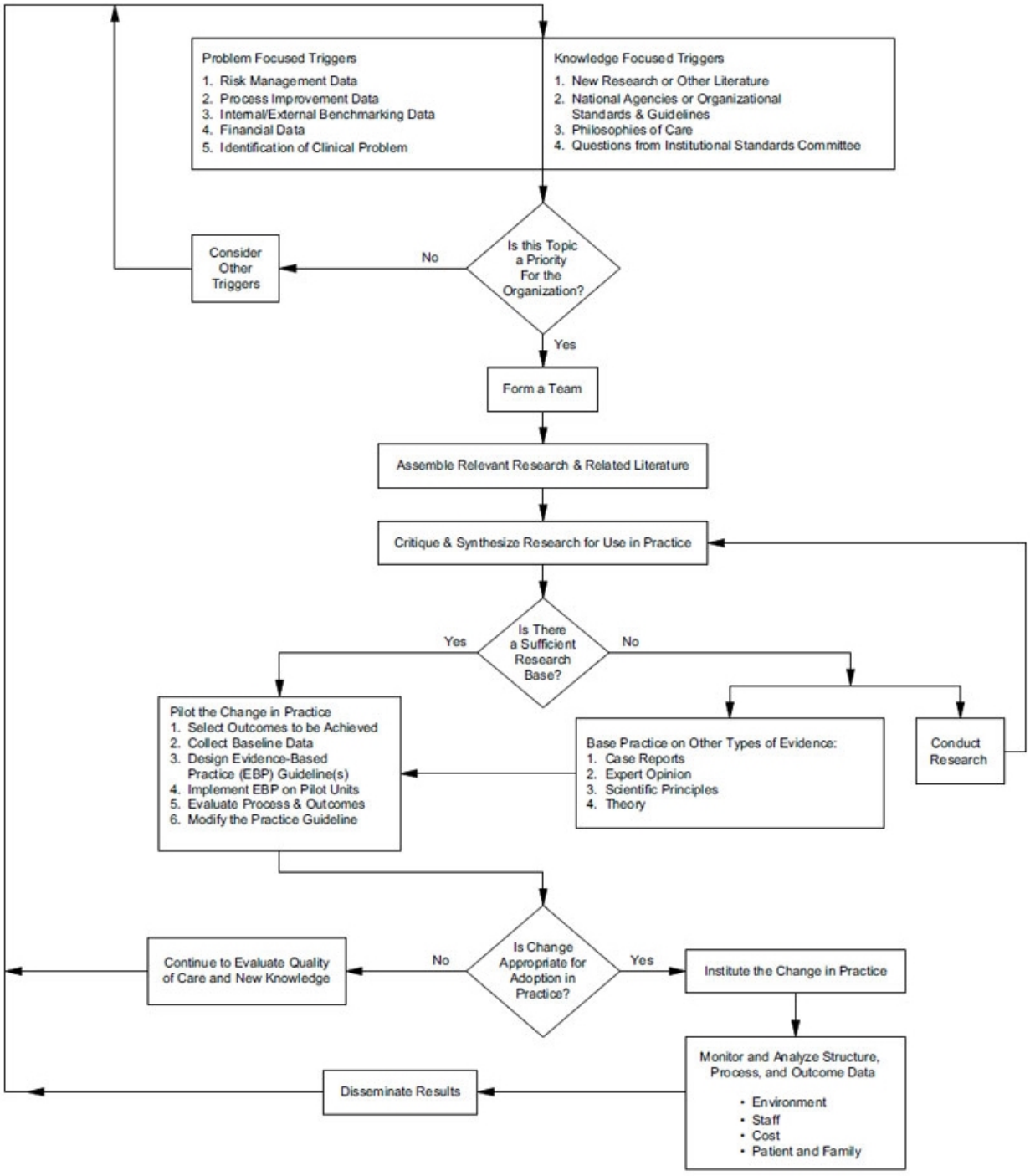
Synthesis Table

	Gaskell & Beaton, 2015	Gordon et al., 2016	Margolis et al., 2013	Nancarrow et al., 2013	Nicksa et al., 2015	Reeves et al, 2013 (SR)	Shanta & Gargiulo, 2014	Sunderji et al., 2016	Willems et al., 2013	Zwarenstein et al., 2009 (SR)
Level of Evidence										
	6	6	4	6	4	1	6	4	6	1
Data and Measurement										
Study Design										
Quantitative					X	X	X		X	5
Qualitative	X	X		X						
Mixed-methods			X					X		
Use of validated tool					X		X			
Estimate of external reliability	–	+	++	++	++	–	–	–	+	+
Internal validity established	+	+	++	+	+++	+++	+++	++	+	+++
Identified bias	–	–	–	–	–	–	–	–	–	–
Population										
Students	X					1	X			
Practitioners		X	X	X		14		X	X	5
Interprofessional mix of subjects		X	X	X	X	15**			X	5
IPE Design										
Didactic										
Focus group / interview	X							X	X	
Classroom / workshop			X	X		15	X			2
Experiential										
Simulation					X					
Clinical / practice-based		X				3*				3
Study Outcomes										
Outcome Type										
Patient or clinical outcome						12				5
Practitioner or team competencies	X	X	X	X	X	3	X	X	X	
IP Variables of Interest										
Leadership	X	X		X	X			X	X	
Communication					X	2			X	
IPP / IPC	X		X			9				5
Teamwork				X	X	4			X	
Emotional Intelligence							X			
Applicability										
Feasibility to replicate	–	+	–	–	+	+	+	+	++	+
Goodness of fit for project design	–	+	+	+	+	–	– –	–	–	+

Table Key
* = 3 studies included a combination of a workshop and clinical-based education; ** = All studies included interprofessional learners, with only one aimed at students versus practitioners; **IPC** = Interprofessional Collaboration; **IPP** = Interprofessional Practice; **SR** = Systematic review (number of results reported for each study in review)

Appendix C

Iowa Model of Research-Based Practice



(Titler, 2010).

Appendix D

UWE-IQ Survey Questions and Scoring Guidelines

The UWE Interprofessional Questionnaire

Communication and Teamwork Scale:

1.*I feel comfortable justifying recommendations/advice face to face with more senior people.

2.*I feel comfortable explaining an issue to people who are unfamiliar with the topic.

3.*I have difficulty in adapting my communication style (oral and written) to particular situations and audiences. **(R = item score is reversed)**

4. I prefer to stay quiet when other people in a group express opinions that I don't agree with. **(R)**

5.*I feel comfortable working in a group.

6. I feel uncomfortable putting forward my personal opinions in a group. **(R)**

7. I feel uncomfortable taking the lead in a group. **(R)**

8.*I am able to become quickly involved in new teams and groups.

9. I am comfortable expressing my own opinions in a group, even when I know that other people don't agree with them.

Interprofessional Learning Scale:

10. My skills in communicating with patients/clients would be improved through learning with students from other health and social care professions.

11. My skills in communicating with other health and social care professionals would be improved through learning with students from other health and social care professions.

12. I would prefer to learn only with peers from my own profession. **(R)**

13. Learning with students from other health and social care professions is likely to facilitate subsequent working professional relationships.

14. Learning with students from other health and social care professions would be more beneficial to improving my teamwork skills than learning only with my peers.

15. Collaborative learning would be a positive learning experience for all health and social care students.

16. Learning with students from other health and social care professions is likely to help to overcome stereotypes that are held about the different professions.

17. I would enjoy the opportunity to learn with students from other health and social care professions.

18. Learning with students from other health and social care professions is likely to improve the service for patient/client.

Interprofessional Interaction Scale:

19. Different health and social care professionals have stereotyped views of each other. **(R)**

20. The line of communication between all members of the health and social care professions is open.

21. There is a status hierarchy in health and social care that affects relationships between professionals. **(R)**

22. Different health and social care professionals are biased in their views of each other. **(R)**

23. All members of health and social care professions have equal respect for each discipline.

24. It is easy to communicate openly with people from other health and social care disciplines.

25. Not all relationships between health and social care professionals are equal. **(R)**

26. Health and social care professionals do not always communicate openly with one another. **(R)**

27. Different health and social care professionals are not always cooperative with one another. **(R)**

Interprofessional Relationships Scale:

28. I have an equal relationship with peers from my own professional discipline.

29. I am confident in my relationships with my peers from my own professional discipline.

30. I have a good understanding of the roles of different health and social care professionals.

31. I am confident in my relationships with people from other health and social care disciplines.

32. I am comfortable working with people from other health and social care disciplines.

33. I feel that I am respected by people from other health and social care disciplines

34. I lack confidence when I work with people from other health and social care disciplines. **(R)**

35. I am comfortable working with people from my own professional discipline.

In the Communication and Teamwork Scale, statements are scored from 1 (strongly agree) to 4 (strongly disagree). Since it is assumed that all respondents will have experience of communication and group work at an informal level, the neutral point is omitted for this scale. The maximum score for this scale is 36, while the minimum is 9. Scores from 9-20, 21-25, and 26-36 are considered to indicate respectively positive, neutral and negative self-assessment of communication and teamwork skills.

In the other three scales, statements are scored from 1 (strongly agree) to 5 (strongly disagree), the neutral point being included. For the Interprofessional Learning and Interprofessional Interaction Scales, scores from 9-22, 23-31, and 32-45 indicate respectively positive, neutral and negative attitudes towards interprofessional learning and perceptions of interprofessional interaction (both these scales have a maximum score of 45 and a minimum of 9).

The Interprofessional Relationships Scale has a maximum score of 40 and a minimum of 8. Scores from 8-20, 21-27, and 28-40 indicate respectively positive, neutral and negative attitudes towards the respondent's own interprofessional relationships.

The statements marked with an asterisk were taken from an existing scale used for self-assessment of communication skills by candidates applying for fast-stream entry to the Civil Service (Crown Copyright 2001), and are reproduced with the permission of the Controller of HMSO and the Queen's Printer for Scotland.

Appendix F

Table F1

Comparison of Pre-/Post- Survey Responses

Scale	Item number	Pre-evaluation Mean	Pre-evaluation Std. Deviation	Post-evaluation Mean	Post-evaluation Std. Deviation	Comparison Mean **
Communication and Teamwork	1	2.50	0.58	1.75	0.50	**-0.75**
	2	2.00	0.00	1.75	0.50	-0.25
	3 *	2.25	0.50	2.50	0.58	0.25
	4 *	2.25	0.50	2.25	0.50	0.00
	5	1.75	0.50	1.75	0.50	0.00
	6 *	2.00	0.82	2.50	0.58	**0.50**
	7 *	2.25	0.50	2.25	0.50	0.00
	8	2.00	0.00	2.00	0.82	0.00
	9	2.25	0.50	2.00	0.82	-0.25
	Scale Means	2.14		2.08		-0.06
Interprofessional Learning	10	1.50	0.58	1.75	0.96	0.25
	11	1.50	0.58	1.75	0.96	0.25
	12 *	1.75	0.96	2.25	1.50	**0.50**
	13	1.75	0.50	1.75	0.96	0.00
	14	2.25	1.26	2.25	0.96	0.00
	15	1.50	0.58	1.75	0.96	0.25
	16	1.75	0.50	2.00	0.82	0.25
	17	1.50	0.58	1.75	0.96	0.25
	18	1.50	0.58	1.75	0.96	0.25
	Scale Means	1.67		1.89		0.22
Interprofessional Interaction	19 *	4.00	0.00	4.00	0.00	0.00
	20	3.00	0.00	2.67	0.58	-0.33
	21 *	3.25	0.50	3.67	0.58	0.42
	22 *	3.75	0.50	4.00	0.00	0.25
	23	3.50	0.58	3.00	1.00	**-0.50**
	24	3.00	0.00	2.00	0.00	**-1.00**
	25	2.50	0.58	2.33	0.58	-0.17
	26 *	3.25	0.50	3.67	0.58	0.42
	27 *	3.25	0.50	3.67	0.58	0.42
	Scale Means	3.28		3.22		-0.06
Interprofessional Relationship	28	2.25	0.96	2.00	0.82	-0.25
	29	1.75	0.50	2.00	0.82	0.25
	30	3.00	0.00	2.00	0.82	**-1.00**
	31	2.25	0.50	1.75	0.50	**-0.50**
	32	2.00	0.00	2.25	1.26	0.25
	33	3.00	0.00	1.75	0.50	**-1.25**
	34 *	3.00	0.82	4.00	0.82	**1.00**
	35	2.00	0.82	1.75	0.50	-0.25
	Scale Means	2.41		2.19		-0.22

* These items have been reverse coded

** Differences in means $\geq$ 0.5 (bolded) were deemed by the author to be clinically significant